Teaching Statistical Inference from Multiple Perspectives Integrating Diverging Schools of Inference

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Carranza & Kuzniak (2008) have analyzed the negative impact of reducing probability to a purely frequentist notion on the students' perception of the methods to learn. In the controversy between classical and Bayesian statisticians, to avoid a subjectivist conception of probability was the last 'argument' to help after inconsistencies in classical statistical inference have shown to be irreparable. However, both schools have their relative merits and flaws as seen from the foundational perspective.

In the famous discussion in the American Statistician (1997), Moore finished with the argument that classical inferential statistics is easier to teach (and understand). Our conclusion conflicts with Moore's views. Knowing the Bayesian way of thinking enhances the comprehension of classical methods (see eg., Gigerenzer, 1993, or Wickmann, 1991). The ongoing debate on the difficulty of inferential statistics and the consequences – at secondary level this part of statistics nearly vanished from curricula worldwide – seems to dissent Moore's judgement.

We base the elaboration of teaching course on the following assumption: To reduce to one view always makes the remaining methods incomplete and harder to understand. It might be rewarding to undergo the burden to develop different views in parallel. Consistently, the idea here is to start with both approaches of inferential statistics and develop them together – in parallel so that students can understand both of them better. The course asks of the students to compare different methods; in order to support that sophisticated task we integrate reflections on philosophical issues, use paradoxes, and make extensive use of computers. We have elaborated on this type of educational approach for several years and can look back to encouraging feedback.

Keywords. Bayesian statistics, conditional probability, favourable relation, statistical inference, confidence interval, Bayesian regions of highest posterior density.